

# Foreword

## How Forecasts Are Made

Most of the annual streamflow in the Western United States originates as snowfall. This snowfall accumulates high in the mountains during winter and early spring. As the snowpack accumulates, hydrologists estimate the runoff that will occur when it melts. Predictions are based on careful measurements of snow water equivalent at selected index points. Precipitation, temperature, soil moisture and antecedent streamflow data are viewed in conjunction with snowpack data to prepare runoff forecasts. This report presents a comprehensive picture of water supply outlook conditions for areas dependent upon surface runoff. It includes selected streamflow forecasts, summarized snowpack and precipitation data, reservoir storage data and narratives describing current conditions.

Streamflow forecasts are cooperatively generated by Soil Conservation Service and National Weather Service hydrologists. Forecasts become more accurate as more data affecting runoff becomes known. For this reason, forecasts are issued that reflect three future precipitation conditions — Below Normal, Average, and Above Normal. These forecasts are termed reasonable minimum, most probable, and reasonable maximum. Actual streamflow can be expected to fall between the lower and upper forecast values eight out of ten years.

Snowpack data are obtained by using a combination of manual and automated measurement methods. Manual readings of snow depth and water equivalent are taken at locations called snow courses on a monthly or semi-monthly schedule during the winter. In addition, snow water equivalent, precipitation, temperature, and other parameters are monitored on a daily basis and transmitted via radio telemetry to central data collection facilities. Both monthly and daily data are used to project snowmelt runoff.

## For More Information

Copies of Monthly Water Supply Outlook Reports and other reports may be obtained from the states listed below. Because of the limited space, snow survey measurements are not published in monthly reports. An annual snow survey data summary is published by the Soil Conservation Service for each of the western states. Historical snow survey data may be obtained at those same offices.

| STATE                    | ADDRESS   |
|--------------------------|---|
| Alaska                   | 201 East 9th Ave., Suite 300, Anchorage, AK 99501-3687                  |
| Arizona                  | 201 East Indianola, Suite 200, Phoenix, AZ 85012                        |
| Colorado<br>(New Mexico) | 2490 West 26th Ave., Denver, CO 80211                                   |
| Idaho                    | 304 North 8th Street, Room 345, Boise, ID 83702                         |
| Montana                  | 10 East Babcock, Room 443, Federal Building, Bozeman, MT 59715          |
| Nevada                   | 50 South Virginia Street, Third Floor, Reno, NV 89505                   |
| Oregon                   | 1220 Southwest 3rd Ave., 16th Floor, Portland, OR 97204                 |
| Utah                     | 4402 Federal Building, 125 South State Street, Salt Lake City, UT 84147 |
| Washington               | 360 U.S. Court House, Spokane, WA 99201                                 |
| Wyoming                  | Federal Building, 100 East "B" Street, Casper, WY 82602                 |

In addition to state reports, a Water Supply Outlook for the Western United States is published by the Soil Conservation Service and National Weather Service monthly, January through May. Reports may be obtained from the Soil Conservation Service, West National Technical Center, 511 Northwest Broadway, Room 547, Portland, OR 97209.

Published by other agencies:

Water Supply Outlook Reports prepared by other agencies include: California — Snow Survey Branch, California Department of Water Resources, P.O. Box 388, Sacramento, CA 95802; British Columbia — The Ministry of Environment, Water Investigations Branch, Parliament Buildings, Victoria, British Columbia, V8V 1X5; Yukon Territory — Department of Indian and Northern Affairs, Northern Operations Branch, 200 Range Road, Whitehorse, Yukon Territory, Y1A 3V1; Alberta, Saskatchewan, and N.W.T. — The Water Survey of Canada, Inland Waters Branch, 110-12 Avenue S.W., Calgary, Alberta, T3C 1A6.

# **Washington Water Supply Outlook**

and

**Federal — State — Private  
Cooperative Snow Surveys**

## **Issued by**

Wilson Scaling  
Chief  
Soil Conservation Service  
Washington, D.C.

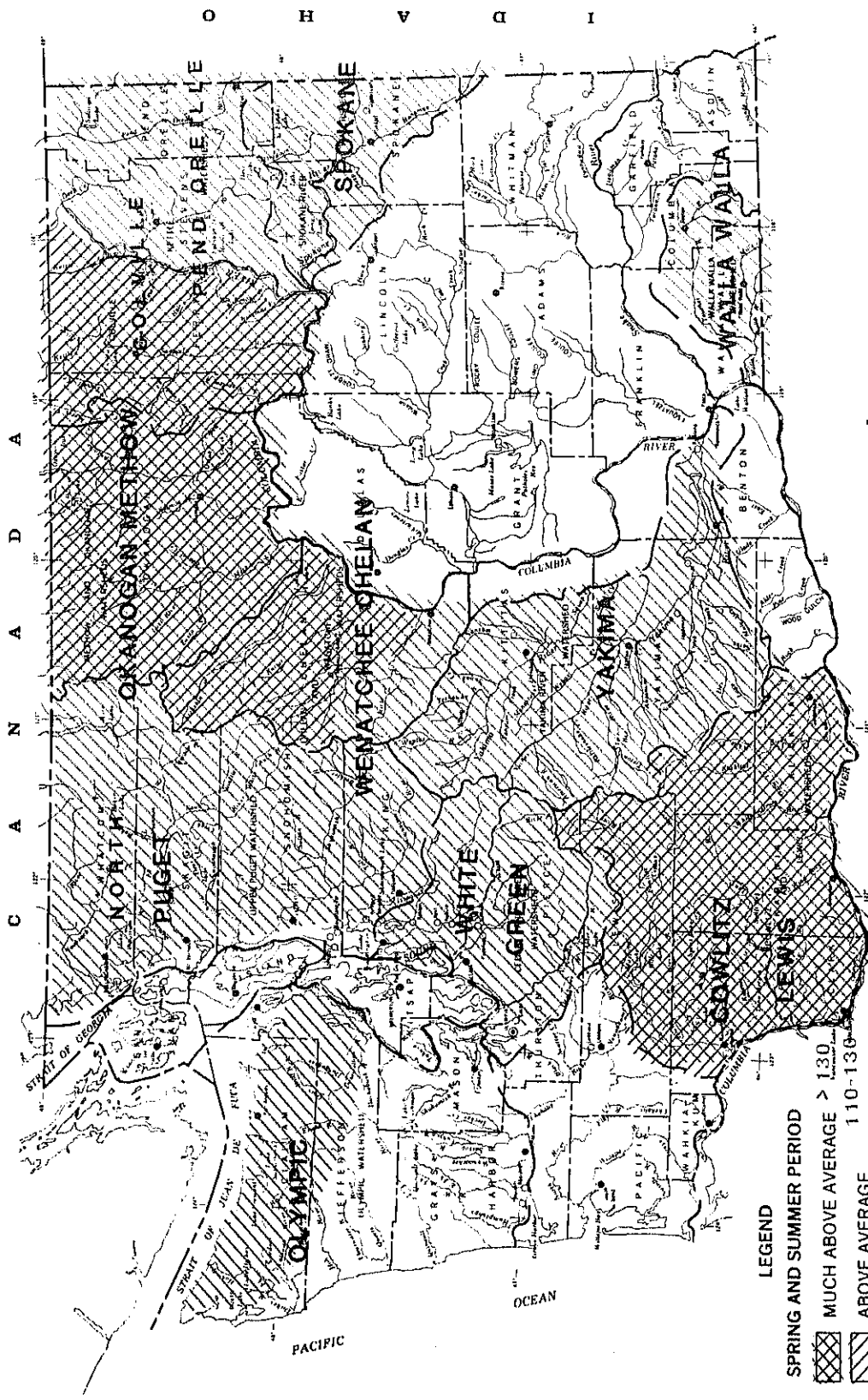
## **Released by**

Lynn A. Brown  
State Conservationist  
Soil Conservation Service  
Spokane, Washington

## **Prepared by**

William F. Weller  
Water Supply Specialist  
Room 360 U.S. Courthouse  
Spokane, Washington 99201





LEGEND

SPRING AND SUMMER PERIOD

- MUCH ABOVE AVERAGE > 130
- ABOVE AVERAGE 110-130
- NEAR AVERAGE 90-110
- BELOW AVERAGE 70-90
- MUCH BELOW AVERAGE > 70
- NOT FORECAST
- WATERSHED BOUNDARY

N  
FEBRUARY 1, 1986  
STREAMFLOW PROSPECTS  
WASHINGTON  
0 25 50 75 100 MI  
0 50 100 150 KM

INDEX to WASHINGTON SNOW COURSES,  
SOIL MOISTURE STATIONS and PRECIPITATION STORAGE GAGES

| NAME                    | NUMBER  | SEC. | TWP. | RANGE | ELEV. |
|-------------------------|---------|------|------|-------|-------|
| UPPER COLUMBIA DRAINAGE |         |      |      |       |       |
| Pend Oreille River      |         |      |      |       |       |
| Boyer Mountain          | 17A2    | 7    | 31N  | 43E   | 5250  |
| Bunchgrass Meadow       | 17A1SP  | 24   | 37N  | 44E   | 5000  |
| Kettle River            |         |      |      |       |       |
| Summit G. S.            | 18A7    | 20   | 39N  | 35E   | 4600  |
| Butte Creek             | 18A3    | 28   | 39N  | 35E   | 4070  |
| Goat Creek              | 18A4    | 26   | 39N  | 33E   | 3595  |
| Spokane River           |         |      |      |       |       |
| Ragged Ridge            | 17B02   | 12   | 27N  | 45E   | 3333  |
| Colville River          |         |      |      |       |       |
| Baird                   | 17A6    | 19   | 36N  | 42E   | 3215  |
| Stranger Mountain       | 17A5    | 26   | 31N  | 38E   | 4990  |
| Chewelah                | 17A4    | 11   | 32N  | 41E   | 4925  |
| Okanagan River          |         |      |      |       |       |
| Milton Creek No. 1      | 19A1    | 30   | 37N  | 24E   | 5700  |
| Milton Creek No. 2      | 19A4    | 19   | 37N  | 24E   | 6000  |
| Saltman Meadows         | 19A2SP  | 33   | 37N  | 24E   | 4500  |
| Methow River            |         |      |      |       |       |
| Harts Pass              | 20A5SP  | 7    | 37N  | 18E   | 6500  |
| Chelan Lake Basin       |         |      |      |       |       |
| Lyman Lake              | 20A23SP | 18   | 31N  | 16E   | 5900  |
| Park Creek Ridge        | 20A12SP | 18   | 34N  | 16E   | 4600  |
| Rainy Pass              | 20A9SP  | 21   | 35N  | 17E   | 4780  |
| Mirror Lake             | 20A39   | 30   | 31N  | 18E   | 5600  |
| Entiat River            |         |      |      |       |       |
| Brief                   | 20B19   | 34   | 28N  | 19E   | 1600  |
| Entiat Meadows          | 20A33a  | 28   | 31N  | 17E   | 4540  |
| Entiat River Trail      | 20A34a  | 2    | 29N  | 17E   | 3325  |
| Fox Camp                | 20A36a  | 17   | 30N  | 18E   | 6510  |
| Pope Ridge              | 20B20   | 22   | 29N  | 18E   | 3540  |
| Pope Ridge Snow Pillow  | 20B24SP | 22   | 29N  | 18E   | 3540  |
| Pugh Ridge              | 20A32a  | 34   | 30N  | 18E   | 6725  |
| Shady Pass              | 20A37   | 20   | 29N  | 19E   | 6200  |
| Snow Brushy             | 20A35a  | 21   | 30N  | 17E   | 3910  |
| Tommy Creek             | 20B21a  | 10   | 28N  | 18E   | 4900  |
| Wenatchee River         |         |      |      |       |       |
| Berno-Mill Creek (New)  | 21B41SP | 13   | 26N  | 14E   | 3240  |
| Blewett Pass No. 2      | 20B25SP | 35   | 22N  | 17E   | 4270  |
| Stevens Pass            | 21B15P  | 14   | 26N  | 13E   | 4070  |
| Trough #2               | 20B25SP | 10   | 20N  | 20E   | 5310  |
| Squitchuck Creek        |         |      |      |       |       |
| Beehive Springs         | 20B3    | 12   | 21N  | 19E   | 4400  |
| Stemilt Creek           |         |      |      |       |       |
| Stemilt Slide           | 20B6    | 30   | 21N  | 20E   | 5000  |
| Upper Wheeler           | 20B7SP  | 30   | 21N  | 20E   | 4400  |
| Yakima River            |         |      |      |       |       |
| Ahtanum R. S.           | 21C11   | 24   | 12N  | 14E   | 3100  |
| Big Boulder Creek       | 21B9SP  | 35   | 23N  | 14E   | 3200  |
| Bumping Lake            | 21C8P   | 23   | 16N  | 12E   | 3450  |
| Bumping Lake New        | 21C36   | 13   | 16N  | 12E   | 3400  |
| Bumping Ridge           | 21C38SP | 9    | 15N  | 12E   | 4600  |
| Fish Lake               | 21B45P  | 28   | 24N  | 14E   | 3371  |
| Green Lake              | 21C10SP | 3    | 12N  | 13E   | 6000  |
| Groene Camp             | 20B11SP | 29   | 21N  | 19E   | 5385  |
| Lake Clo Elum           | 21B14A  | 15   | 20N  | 14E   | 2200  |
| Morse Lake              | 21C17SP | 6    | 16N  | 11E   | 5400  |
| Tunnel Avenue           | 21B8P   | 13   | 21N  | 11E   | 2450  |
| White Pass (East Side)  | 21C28SP | 2    | 13N  | 11E   | 4500  |

| NAME                    | NUMBER  | SEC. | TWP. | RANGE | ELEV. |
|-------------------------|---------|------|------|-------|-------|
| LOWER COLUMBIA DRAINAGE |         |      |      |       |       |
| Asotin Creek            |         |      |      |       |       |
| Spruce Springs          | 17C4    | 9    | 8N   | 40E   | 5700  |
| Touchet River           |         |      |      |       |       |
| Touchet No. 2           | 17C5SP  | 6    | 7N   | 40E   | 5530  |
| Lewis River             |         |      |      |       |       |
| June Lake               | 22C09SP | 26   | 8N   | 5E    | 3200  |
| Lone Pine Shelter       | 21C26SP | 8    | 9N   | 7E    | 3800  |
| Plains of Abraham       | 22C15P  | 35   | 9N   | 5E    | 4400  |
| Spencer Meadow          | 21C20SP | 16   | 8N   | 7E    | 3400  |
| Surprise Lakes          | 21C13SP | 14   | 7N   | 8E    | 4250  |
| Cowlitz River           |         |      |      |       |       |
| Cayuse Pass             | 21C6    | 15   | 16N  | 10E   | 5300  |
| Pigtail Peak            | 21C35SP | 11   | 13N  | 11E   | 5900  |
| Palato Hill             | 21C14SP | 36   | 10N  | 10E   | 4500  |
| Sheep Canyon            | 22C10SP | 12   | 8N   | 4E    | 4050  |
| Strawberry              | 22C08SP | 9    | 10N  | 6E    | 3280  |

| NAME              | NUMBER | SEC. | TWP. | RANGE | ELEV. |
|-------------------|--------|------|------|-------|-------|
| OLYMPIC PENINSULA |        |      |      |       |       |
| Dungeness River   |        |      |      |       |       |
| Deer Park         | 23B4   | 1    | 28N  | 5W    | 5200  |
| Elwha River       |        |      |      |       |       |
| Hurricane         | 23B3   | 36   | 29N  | 7W    | 4500  |
| Cox Valley        | 23B14  | 31   | 29N  | 6W    | 4500  |

| LEGEND |  |  |  |  |  |
|--------|--|--|--|--|--|
| 21A7   | Snow Course Only                           |  |  |  |  |
| 21A7a  | Aerial Marker Only                         |  |  |  |  |
| 21A7a  | Snow Course And Aerial Marker              |  |  |  |  |
| 21A7M  | Snow Course And Soil Moisture Station      |  |  |  |  |
| 21A7M  | Soil Moisture Station                      |  |  |  |  |
| 21A7P  | Snow Course And Precipitation Storage Gage |  |  |  |  |
| 21A7P  | Precipitation Storage Gage                 |  |  |  |  |
| 21A7SP | Snow Pillow                                |  |  |  |  |

| NAME                    | NUMBER  | SEC. | TWP. | RANGE | ELEV. |
|-------------------------|---------|------|------|-------|-------|
| PUGET SOUND DRAINAGE    |         |      |      |       |       |
| Nisqually River         |         |      |      |       |       |
| Paradise Park (New)     | 21C35SP | 13   | 15N  | 8E    | 5500  |
| White River             |         |      |      |       |       |
| Corral Pass             | 21B13SP | 30   | 18N  | 11E   | 6000  |
| Green River             |         |      |      |       |       |
| Aintrip                 | 21B24P  | 18   | 20N  | 11E   | 1800  |
| Charley Creek           | 21B25   | 27   | 21N  | 8E    | 1200  |
| Cougar Mountain         | 21B42SP | 21   | 21N  | 9E    | 3200  |
| Grass Mountain No. 2    | 21B27   | 14   | 20N  | 8E    | 2900  |
| Grass Mountain No. 3    | 21B28   | 12   | 20N  | 8E    | 2100  |
| Lester Creek            | 21B29   | 36   | 20N  | 10E   | 3100  |
| Lynn Lake               | 21B50   | 22   | 20N  | 8E    | 4000  |
| Sawmill Ridge           | 21B31   | 5    | 19N  | 11E   | 4700  |
| Stampede Pass           | 21B10SP | 25   | 21N  | 11E   | 3860  |
| Twin Camp               | 21B30   | 18   | 19N  | 11E   | 4100  |
| Cedar River             |         |      |      |       |       |
| City Cabin              | 21B3    | 10   | 21N  | 10E   | 2390  |
| Mt. Gardner             | 21B21P  | 30   | 22N  | 10E   | 3300  |
| Snoqualmie River        |         |      |      |       |       |
| Alpine Meadow           | 21B48   | 31   | 27N  | 9E    | 3500  |
| Olallie Meadows         | 21B2P   | 19   | 22N  | 11E   | 3625  |
| Olallie Meadows East    | 21B55SP | 20   | 22N  | 11E   | 3700  |
| Skagit River            |         |      |      |       |       |
| Beaver Creek Trail      | 21A4    | 35   | 39N  | 12E   | 2200  |
| Beaver Pass             | 21A1    | 9    | 39N  | 12E   | 3680  |
| Brown Top               | 21A2Ba  | 26   | 40N  | 12E   | 6000  |
| Devils Park             | 20A4    | 34   | 38N  | 16E   | 5900  |
| Freezeout Creek Trail   | 20A1    | 14   | 40N  | 14E   | 3500  |
| Freezeout Meadows (New) | 20A38   | 8    | 40N  | 16E   | 5000  |
| Granite Creek           | 20A06   | 25   | 36N  | 16E   | 3500  |
| Meadows Cabins          | 20A8    | 29   | 36N  | 14E   | 1900  |
| New Hazomeen Lake       | 21A30   | 19   | 40N  | 14E   | 2800  |
| Thunder Basin           | 20A07   | 10   | 35N  | 14E   | 4200  |

## GENERAL OUTLOOK

### SUMMARY:

The February 1 snowpack is below average for the west slope of the Cascade Mountains of Washington and the extreme eastern portion of the state. Snowcover is near or above average for the east slopes of the Cascade mountains. Streamflows continued to be below average for January, while precipitation was above average. Forecasted streamflows vary from near average to below average. In the below average are Olympics 74%, Green 76%, Spokane 75% and the Pend Oreille at 85%.

### SNOWPACK:

Snowpack in Washington varied greatly with 60% of normal in the Elwah and Green River basins to 138% of average in the Squilchuck Basin above Wenatchee. Snow surveys taken in other areas of the state show the following snow cover; Spokane and Pend Oreille 71%, Cowlitz 82%, and the Skagit 90%, Okanogan 112%, Wenatchee 86%, Yakima 90%, Walla Walla 81%, Cowlitz 82% and the Skagit 90%.

### PRECIPITATION:

Precipitation was above normal over most of Washington during January. Extremely heavy rainfall occurred January 18 with some stations reporting new record maximum 24 hour precipitation rates. The northwest slopes of the Cascades were 100% of average while the south west slope were at 97%. The eastern slopes of the Cascades were 107% of average and the northeast area of Washington was 141% of normal for January.

### RESERVOIRS:

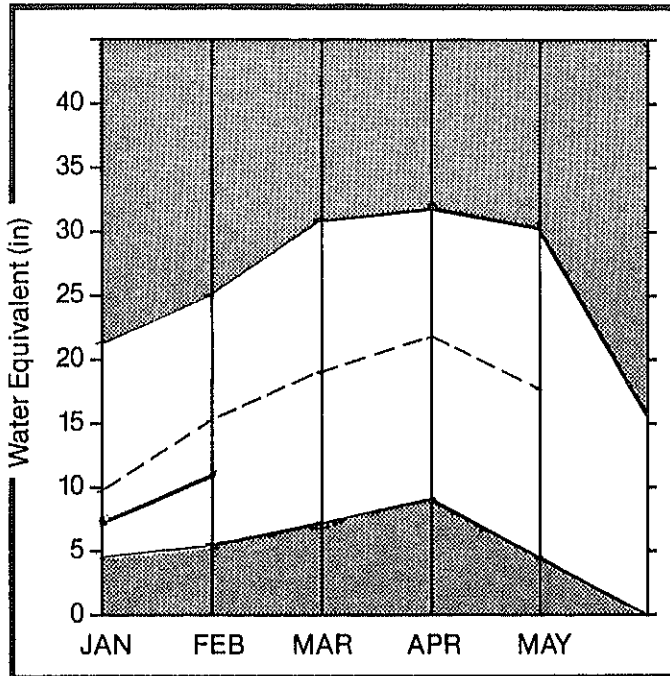
Reservoir storage continued below normal for January. Storage in the Yakima Basin as reported by the Bureau of Reclamation was 441,000 acre feet or 61% of the normal February 1 storage. Irrigation reservoirs in the Okanogan area were at 76% of normal storage. Power storage reservoirs at Chelan are at 60% and Coeur d' Alene is at 25% of normal. Reservoir storage is still showing the effects of a cold, dry December and January.

## STREAMFLOW:

January streamflow was below normal. The western side of the state had 80% of normal runoff on the Cowlitz River, 99% on the Chehalis, and 93% on the Skykomish River. The eastern slope of the Cascades had 81% of normal runoff from Lake Chelan, 69% from the Wenatchee River, and 40% from the Yakima River. Flows from the Columbia River at the international boundary were 90% of the January normal and 82% at The Dalles. The Spokane River was 49% of normal and the Pend Oreille River was at 84%.

# SPOKANE

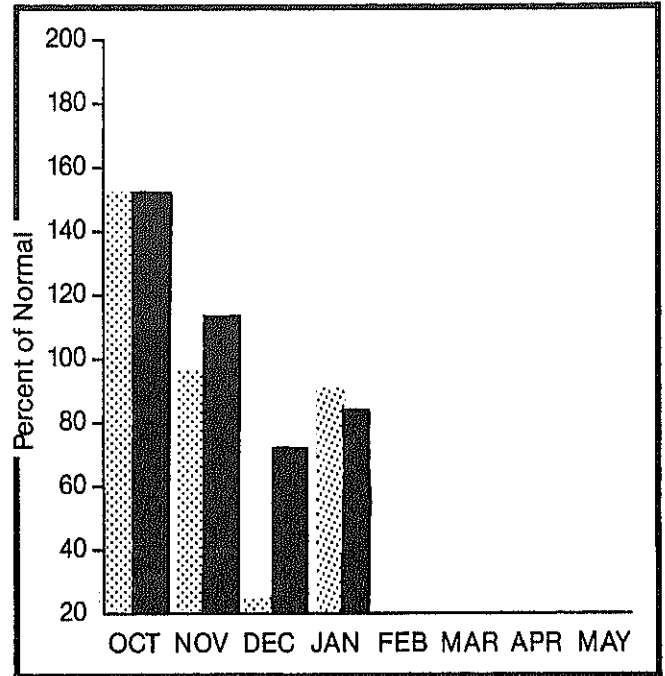
**Mountain snowpack\*** (Inches)



\*Based on selected stations

Maximum Average Minimum Current

**Precipitation\*** (percent of normal)



\*Based on selected stations

Monthly precipitation Year to date precipitation

## SPOKANE RIVER BASIN

### WATER SUPPLY OUTLOOK:

The forecasted streamflows show no improvement for February 1, with 75% of average for the Spokane River. Precipitation was 91% of the January normal, reducing the water year total to 82% of average. Streamflow for the Spokane River is reported to be 49% of normal for January. Spokane temperatures were 4 degrees above normal for January. Storage in Coeur d' Alene Lake is 25% of average. Snowpack for the Basin was 69% of normal for February first.

For more information contact your local Soil Conservation Service office.



# SPOKANE RIVER BASIN

## STREAMFLOW FORECASTS

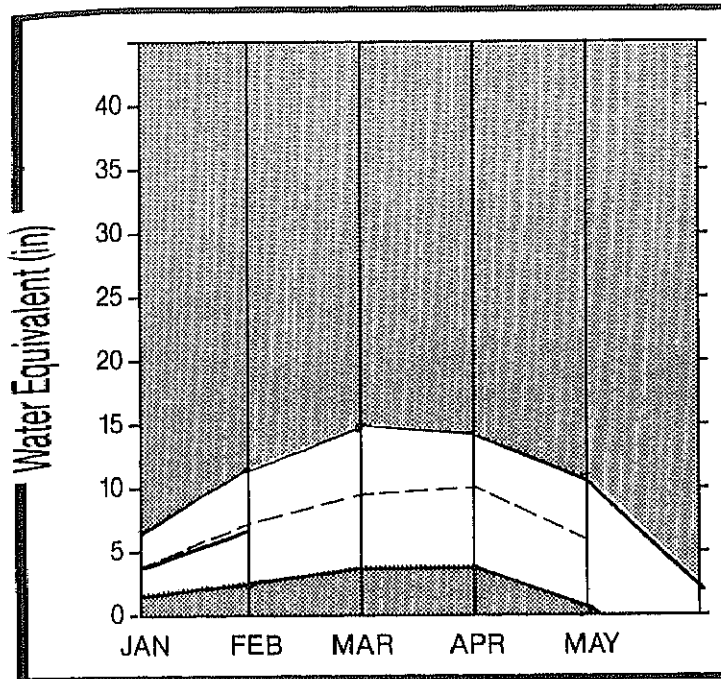
| FORECAST POINT        | FORECAST PERIOD | 20 YR. AVE. (1000AF) | MOST PROBABLE (1000AF) | MOST PROBABLE (% AVE.) | REAS. MAX. (% AVE.) | REAS. MIN. (% AVE.) | PEAK FLOW (CFS) | PEAK DATE | LOW FLOW (CFS) | LOW DATE |
|-----------------------|-----------------|----------------------|------------------------|------------------------|---------------------|---------------------|-----------------|-----------|----------------|----------|
| SPOKANE at Post Falls | APR-SEP         | 2848.0               | 2160.0                 | 75                     | 112                 | 40                  |                 |           |                |          |
|                       | APR-JUL         | 2754.0               | 2090.0                 | 75                     | 112                 | 40                  |                 |           |                |          |

| RESERVOIR STORAGE (1000AF) |                  |           |           |         | WATERSHED SNOWPACK ANALYSIS |                   |                                    |    |
|----------------------------|------------------|-----------|-----------|---------|-----------------------------|-------------------|------------------------------------|----|
| RESERVOIR                  | USEABLE CAPACITY | THIS YEAR | LAST YEAR | AVERAGE | WATERSHED                   | NO. COURSES AVE.D | THIS YEAR AS % OF LAST YR. AVERAGE |    |
| COEUR D'ALENE              | 225.1            | 89.2      | 31.3      | 142.4   | Spokane River               | 12                | 60                                 | 69 |

\*Corrected for upstream diversions or changes in reservoir storage.  
Average is for 1961-80 period.

# COLVILLE AND PEND OREILLE

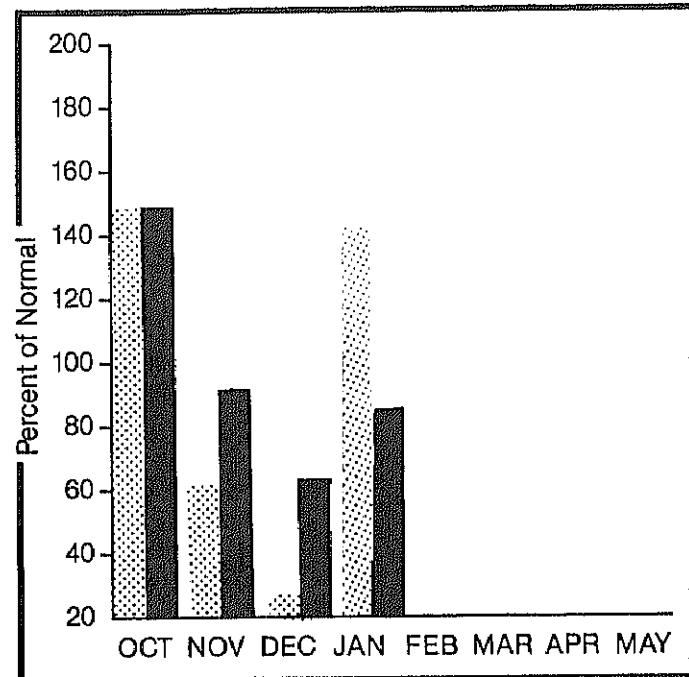
**Mountain snowpack\*** (inches)



\* Based on selected stations

Maximum  Average   
Minimum  Current 

**Precipitation\*** (percent of normal)



\* Based on selected stations

Monthly precipitation  Year to date precipitation 

## COLVILLE - PEND OREILLE RIVER BASINS

### WATER SUPPLY OUTLOOK:

Forecasted stream flows vary over the basin, with 78% predicted for the Pend Oreille River, 100% on the Kettle River and 85% on the Colville River. Temperatures were 5 degrees above average for January while precipitation was 145% of the January normal. The above average precipitation raised the water year total to 84% of normal. January streamflows were 84% of average on the Pend Oreille, while the Kettle gage was iced in. Snowpack varied from 70% of normal on the Pend Oreille to 95% on the Kettle River.

For more information contact your local Soil Conservation Service office.

STREAMFLOW FORECASTS

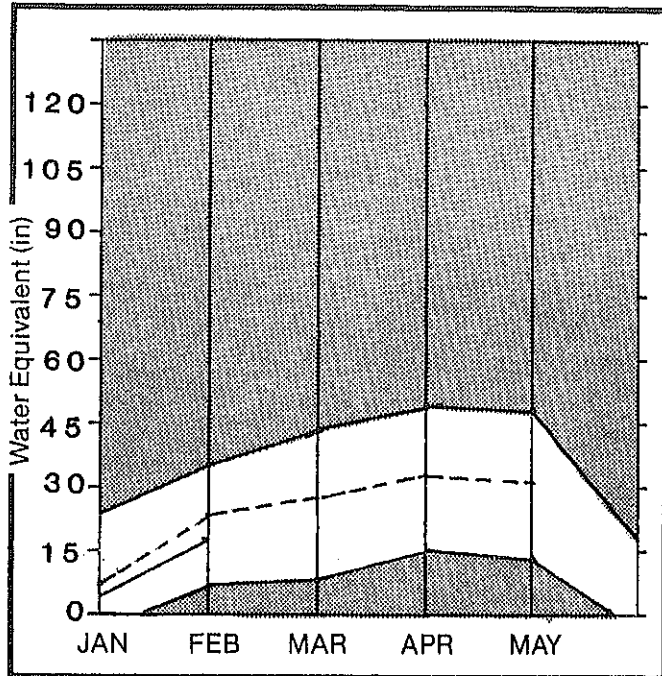
| FORECAST POINT                    | FORECAST PERIOD | 20 YR. AVE. (1000AF) | MOST PROBABLE (1000AF) | MOST PROBABLE (% AVE.) | REAS. MAX. (% AVE.) | REAS. MIN. (% AVE.) | PEAK FLOW (CFS) | PEAK DATE | LOW FLOW (CFS) | LOW DATE |
|-----------------------------------|-----------------|----------------------|------------------------|------------------------|---------------------|---------------------|-----------------|-----------|----------------|----------|
| PEND OREILLE RIVER bl Boz. Canyon | APR-SEP         | 15425.0              | 12000.0                | 77                     | 100                 | 86                  |                 |           |                |          |
|                                   | APR-JUL         | 14156.0              | 11000.0                | 77                     | 100                 | 86                  |                 |           |                |          |
|                                   | APR-JUN         | 12227.0              | 9540.0                 | 78                     | 100                 | 86                  |                 |           |                |          |
| COLVILLE RIVER at Kettle Falls    | APR-SEP         | 134.0                | 114.0                  | 85                     | 135                 | 85                  |                 |           |                |          |
|                                   | APR-JUL         | 123.0                | 104.0                  | 84                     | 135                 | 85                  |                 |           |                |          |
|                                   | APR-JUN         | 114.0                | 96.0                   | 84                     | 134                 | 84                  |                 |           |                |          |
| KETTLE RIVER nr. Laurier          | APR-SEP         | 1829.0               | 1830.0                 | 100                    | 139                 | 61                  |                 |           |                |          |
|                                   | APR-JUL         | 1738.0               | 1740.0                 | 100                    | 139                 | 61                  |                 |           |                |          |
|                                   | APR-JUN         | 1581.0               | 1580.0                 | 99                     | 139                 | 61                  |                 |           |                |          |
| COLUMBIA RIVER at Birchbank *     | APR-SEP         | 44605.0              | 42600.0                | 95                     | 116                 | 76                  |                 |           |                |          |
|                                   | APR-JUL         | 35705.0              | 34100.0                | 95                     | 116                 | 76                  |                 |           |                |          |
|                                   | APR-JUN         | 26027.0              | 24700.0                | 94                     | 115                 | 75                  |                 |           |                |          |
| COLUMBIA RIVER at Grand Coulee *  | APR-SEP         | 66841.0              | 60600.0                | 90                     | 108                 | 74                  |                 |           |                |          |
|                                   | APR-JUL         | 56169.0              | 50900.0                | 90                     | 108                 | 74                  |                 |           |                |          |
|                                   | APR-JUN         | 44036.0              | 40100.0                | 91                     | 108                 | 74                  |                 |           |                |          |

| RESERVOIR STORAGE (1000AF) |                  | WATERSHED SNOWPACK ANALYSIS                             |                       |  |
|----------------------------|------------------|---|-----------------------|--|
| RESERVOIR                  | USEABLE CAPACITY | ** USEABLE STORAGE **<br>THIS YEAR    LAST YEAR    AVE. | WATERSHED             | NO. COURSES AVE.D    THIS YEAR AS % OF LAST YR.    AVERAGE |
| ROOSEVELT                  | 5232.0           | 5018.0    4224.0    3740.0                              | Colville River        | 0    0    0  |
| BANKS                      | 715.0            | 571.0    774.0    599.0                                 | Pend Oreille River    | 9    63    70  |
|                            |                  |   | Kettle River          | 6    93    91  |
|                            |                  |   | Omac Lake, Twin Lakes | 0    0    0  |
|                            |                  |   | Newman Lake           | 0    0    0  |

\*Corrected for upstream diversions or changes in reservoir storage.  
Average is for 1961-80 period.

# OKANOGAN AND METHOW

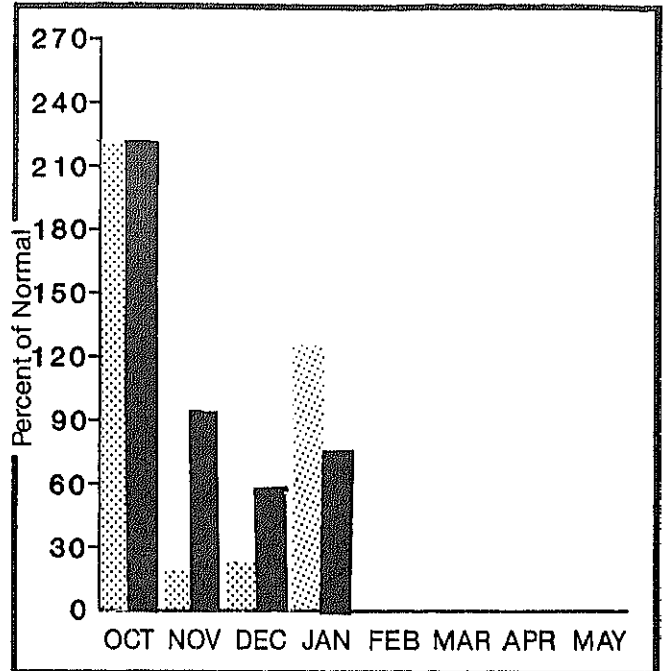
Mountain snowpack\* (Inches)



\*Based on selected stations

Maximum  Average   
Minimum  Current 

Precipitation\* (percent of normal)



\*Based on selected stations

Monthly precipitation  Year to date precipitation 

## OKANOGAN - METHOW RIVER BASINS

### WATER SUPPLY OUTLOOK:

Snowpack on the Okanogan Basin showed improvement in the Canadian portion of the watershed with 112% of February 1 average. The U.S. snow courses were 76% of average. The snow covering the Methow is at 84 % of normal. Forecasted streamflows are 93% on the Okanogan and 94% on the Methow River. January precipitation was 123% of normal raising the water year total to 75% of average. Stream gages were iced in on the Okanogan River. Temperatures averaged 6 degrees above normal. Reservoir storage was 76% of

For more information contact your local Soil Conservation Service office.

# OKANOGAN - METHOW RIVER BASINS

## STREAKFLOW FORECASTS

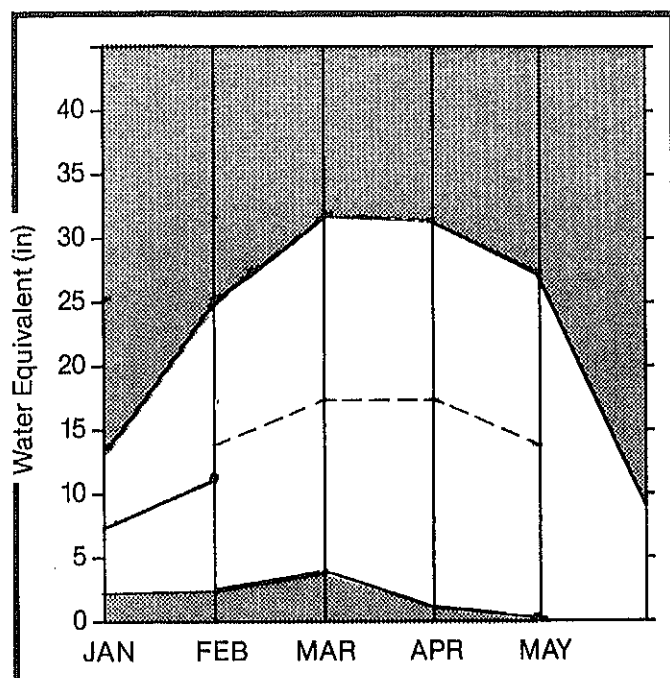
| FORECAST POINT          | FORECAST PERIOD | 20 YR. AVE. (1000AF) | MOST PROBABLE (1000AF) | MOST PROBABLE (% AVE.) | REAS. MAX. (% AVE.) | REAS. MIN. (% AVE.) | PEAK FLOW (CFS) | PEAK DATE | LOW FLOW (CFS) | LOW DATE |
|-------------------------|-----------------|----------------------|------------------------|------------------------|---------------------|---------------------|-----------------|-----------|----------------|----------|
| KANEEN R. nr Nighthawk  | APR-SEP         | 1462.0               | 1370.0                 | 93                     | 146                 | 42                  |                 |           |                |          |
|                         | APR-JUL         | 1365.0               | 1280.0                 | 93                     | 146                 | 42                  |                 |           |                |          |
|                         | APR-JUN         | 1161.0               | 1090.0                 | 93                     | 146                 | 42                  |                 |           |                |          |
| OKANOGAN R. nr Tonasket | APR-SEP         | 1644.0               | 1540.0                 | 93                     | 148                 | 40                  |                 |           |                |          |
|                         | APR-JUL         | 1497.0               | 1400.0                 | 93                     | 147                 | 40                  |                 |           |                |          |
|                         | APR-JUN         | 1262.0               | 1180.0                 | 93                     | 147                 | 40                  |                 |           |                |          |
| METHOW RIVER nr Pateros | APR-SEP         | 980.0                | 930.0                  | 94                     | 126                 | 64                  |                 |           |                |          |
|                         | APR-JUL         | 908.0                | 860.0                  | 94                     | 126                 | 64                  |                 |           |                |          |
|                         | APR-JUN         | 773.0                | 734.0                  | 94                     | 126                 | 64                  |                 |           |                |          |

| RESERVOIR STORAGE (1000AF) |                  |                       |           |      | WATERSHED SNOWPACK ANALYSIS |                   |                   |         |
|----------------------------|------------------|-----------------------|-----------|------|-----------------------------|-------------------|-------------------|---------|
| RESERVOIR                  | USEABLE CAPACITY | ** USEABLE STORAGE ** |           |      | WATERSHED                   | NO. COURSES AVE.D | THIS YEAR AS % OF |         |
|                            |                  | THIS YEAR             | LAST YEAR | AVE. |                             |                   | LAST YR.          | AVERAGE |
|                            |                  |                       |           |      | Okanogan River              | 22                | 90                | 87      |
|                            |                  |                       |           |      | Methow River                | 2                 | 81                | 84      |

Corrected for upstream diversions or changes in reservoir storage.  
Average is for 1961-80 period.

# WENATCHEE AND CHELAN

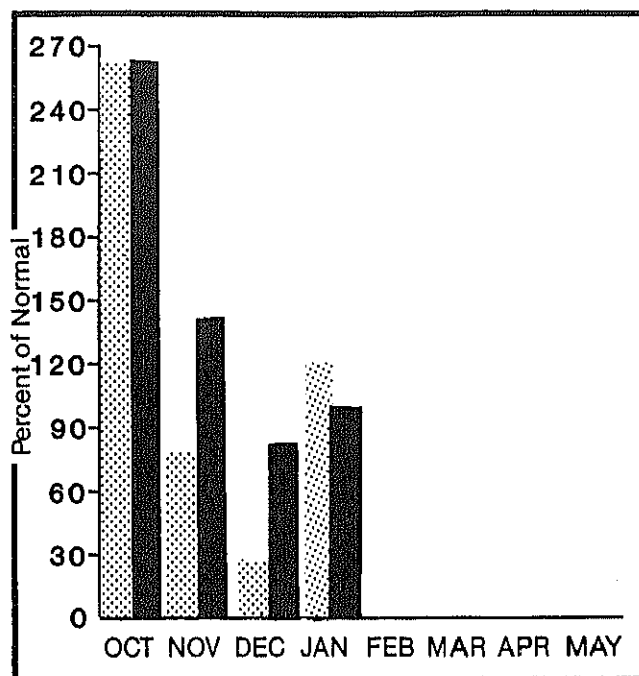
**Mountain snowpack\* (inches)**



\*Based on selected stations

Maximum  Average   
Minimum  Current 

**Precipitation\* (percent of normal)**



\*Based on selected stations

Monthly precipitation  Year to date precipitation 

## WENATCHEE - CHELAN RIVER BASINS

### WATER SUPPLY OUTLOOK:

The percent snow cover increased over the basin improving from the January 1st readings on the Chelan from 75% to 107%, and on the Wenatchee from 74% to 86%. Forecasted streamflow for the April-September period are for 94% on the Chelan, 94% on the Wenatchee, 93% on the Entiat and 94% on the Stimelt. Precipitation was 120% of average for January bringing the water year total to 96% of normal. Streamflows were 81% on the Chelan and 69% on the Wenatchee River. Storage in the Chelan was 60%.

For more information contact your local Soil Conservation Service office.

# WENATCHEE - CHELAN RIVER BASINS

## STREAMFLOW FORECASTS

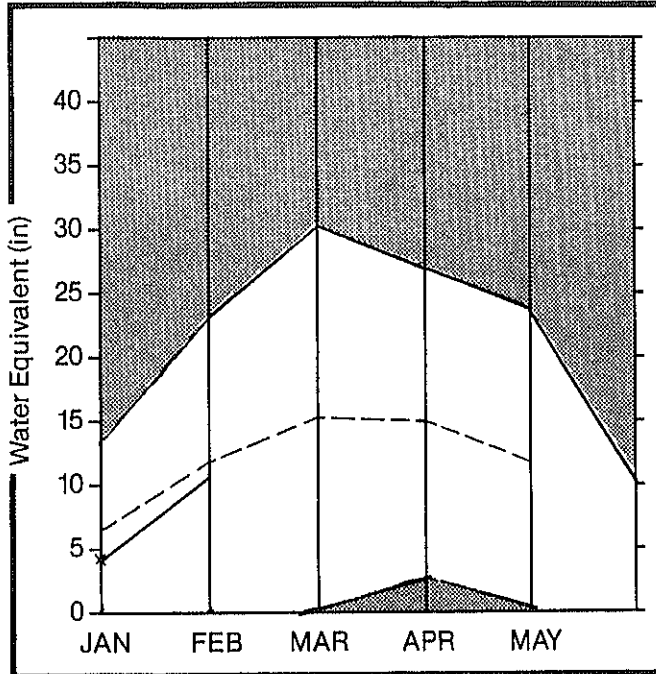
| FORECAST POINT                   | FORECAST PERIOD | 20 YR. AVE. (1000AF) | MOST PROBABLE (1000AF) | MOST PROBABLE (% AVE.) | REAS. MAX. (% AVE.) | REAS. MIN. (% AVE.) | PEAK FLOW (CFS) | PEAK DATE | LOW FLOW (CFS) | LOW DATE |
|----------------------------------|-----------------|----------------------|------------------------|------------------------|---------------------|---------------------|-----------------|-----------|----------------|----------|
| CHELAN RIVER at Chelan *         | APR-SEP         | 1203.0               | 1142.0                 | 94                     | 120                 | 70                  |                 |           |                |          |
|                                  | APR-JUL         | 1055.0               | 1000.0                 | 94                     | 120                 | 70                  |                 |           |                |          |
|                                  | APR-JUN         | 826.0                | 780.0                  | 94                     | 119                 | 69                  |                 |           |                |          |
| STEHEKIN R. at Stehekin          | APR-SEP         | 860.0                | 840.0                  | 97                     | 118                 | 78                  |                 |           |                |          |
|                                  | APR-JUL         | 727.0                | 710.0                  | 97                     | 118                 | 78                  |                 |           |                |          |
|                                  | APR-JUN         | 553.0                | 540.0                  | 97                     | 118                 | 78                  |                 |           |                |          |
| ENTIAI RIVER nr Ardenvoir        | APR-SEP         | 234.6                | 220.0                  | 93                     |                     |                     |                 |           |                |          |
|                                  | APR-JUL         | 213.0                | 200.0                  | 93                     |                     |                     |                 |           |                |          |
|                                  | APR-JUN         | 172.0                | 160.0                  | 93                     |                     |                     |                 |           |                |          |
| WENATCHEE RIVER at Plain         | APR-SEP         | 1270.0               | 1200.0                 | 94                     | 120                 | 70                  |                 |           |                |          |
|                                  | APR-JUL         | 1113.0               | 1050.0                 | 94                     | 128                 | 60                  |                 |           |                |          |
|                                  | APR-JUN         | 899.0                | 850.0                  | 94                     | 129                 | 61                  |                 |           |                |          |
| STEMILT nr Wenatchee (miners in) | MAY-SEP         | 138.0                | 131.0                  | 94                     |                     |                     |                 |           |                |          |
| ICICLE CREEK nr Leavenworth      | APR-SEP         | 370.0                | 330.0                  | 89                     |                     |                     |                 |           |                |          |
|                                  | APR-JUL         | 340.0                | 300.0                  | 88                     |                     |                     |                 |           |                |          |
|                                  | APR-JUN         | 270.0                | 240.0                  | 88                     |                     |                     |                 |           |                |          |
| COLUMBIA R. bl Rock Island Dam * | APR-SEP         | 72761.0              | 67000.0                | 92                     | 110                 | 74                  |                 |           |                |          |
|                                  | APR-JUL         | 61601.0              | 56700.0                | 92                     | 118                 | 74                  |                 |           |                |          |
|                                  | APR-JUN         | 48384.0              | 44500.0                | 92                     | 110                 | 74                  |                 |           |                |          |

| RESERVOIR STORAGE |                     |                       |              |       | (1000AF)          | WATERSHED SNOWPACK ANALYSIS |                   |         |  |
|-------------------|---------------------|-----------------------|--------------|-------|-------------------|-----------------------------|-------------------|---------|--|
| RESERVOIR         | USEABLE<br>CAPACITY | ** USEABLE STORAGE ** |              |       | WATERSHED         | NO.<br>COURSES<br>AVE.D     | THIS YEAR AS % OF |         |  |
|                   |                     | THIS<br>YEAR          | LAST<br>YEAR | AVE.  |                   |                             | LAST YR.          | AVERAGE |  |
| CHELAN LAKE       | 676.1               | 667.0                 | 224.7        | 950.0 | Chelan Lake Basin | 3                           | 108               | 107     |  |
|                   |                     |                       |              |       | Entiat River      | 2                           | 140               | 102     |  |
|                   |                     |                       |              |       | Wenatchee River   | 7                           | 83                | 86      |  |
|                   |                     |                       |              |       | Colockum Creek    | 1                           | 109               | 118     |  |
|                   |                     |                       |              |       | Squilchuck Creek  | 1                           | 191               | 130     |  |
|                   |                     |                       |              |       | Stemilt Creek     | 1                           | 135               | 105     |  |



\*Corrected for upstream diversions or changes in reservoir storage.  
Average is for 1961-80 period.

# YAKIMA

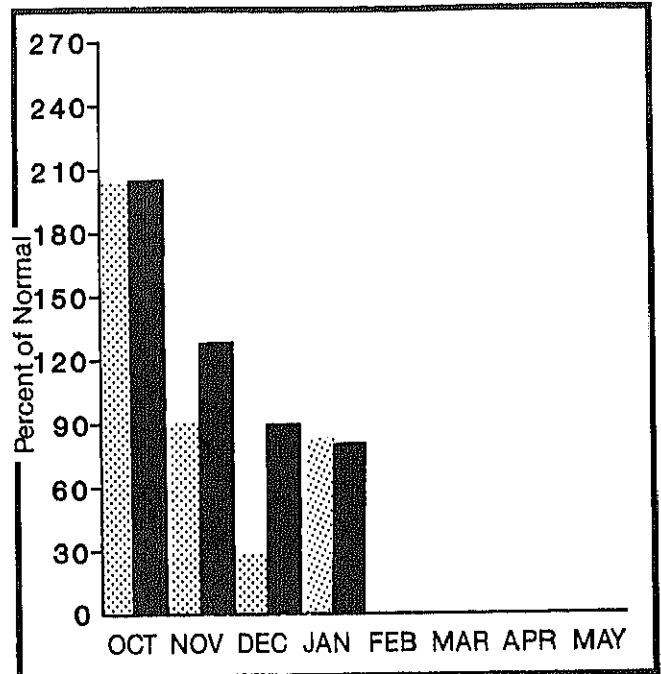
**Mountain snowpack\* (inches)**



\*Based on selected stations

Maximum  Average   
Minimum  Current 

**Precipitation\* (percent of normal)**



\*Based on selected stations

Monthly precipitation  Year to date precipitation 

## YAKIMA RIVER BASIN

### WATER SUPPLY OUTLOOK:

Snow cover improved in the Yakima Basin to 90% of average. Streamflow forecasted for the basin include 89% for the Yakima River at Martin, 90% on the Naches, 90% on the Tieton and 88% on the Ahtanum. Reservoir storage showed minor improvement, but remained at 61% of normal with 441,000 acre feet impounded. January precipitation was 86% of normal with temperatures 2 degrees above average. Streamflow was 40% of normal on the Yakima River.

For more information contact your local Soil Conservation Service office.



# YAKIMA RIVER BASIN

## STREAMFLOW FORECASTS

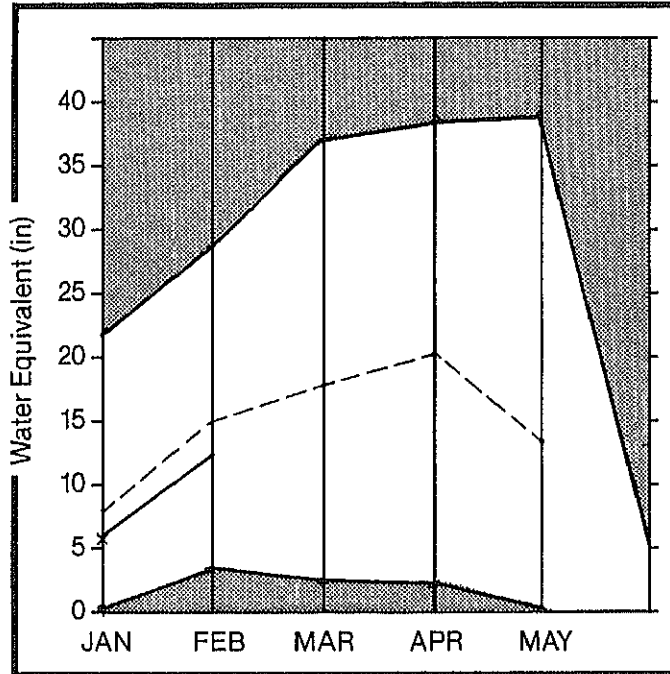
| FORECAST POINT              | FORECAST PERIOD | 20 YR. AVE. (1000AF) | MOST PROBABLE (1000AF) | MOST PROBABLE (% AVE.) | REAS. MAX. (% AVE.) | REAS. MIN. (% AVE.) | PEAK FLOW (CFS) | PEAK DATE | LOW FLOW (CFS) | LOW DATE |
|-----------------------------|-----------------|----------------------|------------------------|------------------------|---------------------|---------------------|-----------------|-----------|----------------|----------|
| YAKIMA RIVER at Martin *    | APR-SEP         | 139.0                | 125.0                  | 89                     | 100                 | 74                  |                 |           |                |          |
|                             | APR-JUL         | 128.0                | 115.0                  | 89                     | 100                 | 74                  |                 |           |                |          |
|                             | APR-JUN         | 111.0                | 100.0                  | 90                     | 100                 | 74                  |                 |           |                |          |
| YAKIMA RIVER at Cle Elum *  | APR-SEP         | 943.0                | 785.0                  | 83                     | 94                  | 70                  |                 |           |                |          |
|                             | APR-JUL         | 854.0                | 711.0                  | 83                     | 94                  | 70                  |                 |           |                |          |
|                             | APR-JUN         | 734.0                | 609.0                  | 82                     | 94                  | 70                  |                 |           |                |          |
| YAKIMA RIVER nr Parker *    | APR-SEP         | 2096.0               | 1760.0                 | 83                     | 100                 | 62                  |                 |           |                |          |
|                             | APR-JUL         | 1898.0               | 1590.0                 | 83                     | 100                 | 62                  |                 |           |                |          |
|                             | APR-JUN         | 1667.0               | 1400.0                 | 83                     | 100                 | 62                  |                 |           |                |          |
| KACHESS RIVER nr Easton *   | APR-SEP         | 121.0                | 110.0                  | 90                     | 100                 | 77                  |                 |           |                |          |
|                             | APR-JUL         | 115.0                | 100.0                  | 87                     | 101                 | 73                  |                 |           |                |          |
|                             | APR-JUN         | 101.0                | 90.0                   | 89                     | 100                 | 70                  |                 |           |                |          |
| CLE ELUM RIVER nr Roslyn *  | APR-SEP         | 463.0                | 420.0                  | 90                     | 100                 | 77                  |                 |           |                |          |
|                             | APR-JUL         | 422.0                | 380.0                  | 90                     | 100                 | 76                  |                 |           |                |          |
|                             | APR-JUN         | 353.0                | 320.0                  | 90                     | 100                 | 77                  |                 |           |                |          |
| BUMPING RIVER nr Nile *     | APR-SEP         | 142.0                | 126.0                  | 88                     | 110                 | 69                  |                 |           |                |          |
|                             | APR-JUL         | 129.0                | 114.0                  | 88                     | 110                 | 68                  |                 |           |                |          |
|                             | APR-JUN         | 107.0                | 95.0                   | 88                     | 110                 | 68                  |                 |           |                |          |
| AMERICAN RIVER nr Nile      | APR-SEP         | 124.0                | 110.0                  | 88                     | 114                 | 64                  |                 |           |                |          |
|                             | APR-JUL         | 113.0                | 100.0                  | 88                     | 110                 | 60                  |                 |           |                |          |
|                             | APR-JUN         | 94.0                 | 85.0                   | 89                     | 114                 | 64                  |                 |           |                |          |
| TIETON RIVER at Tieton *    | APR-SEP         | 246.0                | 221.0                  | 90                     | 110                 | 60                  |                 |           |                |          |
|                             | APR-JUL         | 207.0                | 190.0                  | 91                     | 117                 | 57                  |                 |           |                |          |
|                             | APR-JUN         | 165.0                | 150.0                  | 90                     | 117                 | 60                  |                 |           |                |          |
| NACHES RIVER nr Naches *    | APR-SEP         | 867.0                | 751.0                  | 86                     | 110                 | 59                  |                 |           |                |          |
|                             | APR-JUL         | 784.0                | 679.0                  | 86                     | 110                 | 59                  |                 |           |                |          |
|                             | APR-JUN         | 667.0                | 580.0                  | 86                     | 110                 | 59                  |                 |           |                |          |
| AHATANUM CREEK nr Tappico * | APR-SEP         | 47.0                 | 41.0                   | 87                     | 120                 | 57                  |                 |           |                |          |
|                             | APR-JUL         | 43.0                 | 38.0                   | 89                     | 120                 | 59                  |                 |           |                |          |
|                             | APR-JUN         | 37.0                 | 33.0                   | 89                     | 120                 | 59                  |                 |           |                |          |

| RESERVOIR STORAGE (1000AF) |                  |                           |                           |                      | WATERSHED SNOWPACK ANALYSIS |                   |                                    |
|----------------------------|------------------|---------------------------|---------------------------|----------------------|-----------------------------|-------------------|------------------------------------|
| RESERVOIR                  | USEABLE CAPACITY | USEABLE STORAGE THIS YEAR | USEABLE STORAGE LAST YEAR | USEABLE STORAGE AVE. | WATERSHED                   | NO. COURSES AVE.D | THIS YEAR AS % OF LAST YR. AVERAGE |
| KEECHULUS                  | 157.8            | 42.4                      | 83.2                      | 96.0                 | Yakima River                | 15                | 110 90                             |
| KACHESS                    | 239.0            | 107.0                     | 149.0                     | 176.0                | Ahtanum Creek               | 2                 | 130 81                             |
| CLE ELEM                   | 436.9            | 120.0                     | 175.0                     | 251.0                |                             |                   |                                    |
| BUMPING LAKE               | 33.7             | 8.2                       | 3.0                       | 6.0                  |                             |                   |                                    |
| RIMROCK                    | 198.0            | 120.0                     | 92.1                      | 115.0                |                             |                   |                                    |



\*Corrected for upstream diversions or changes in reservoir storage.  
Average is for 1961-80 period.

# WALLA WALLA

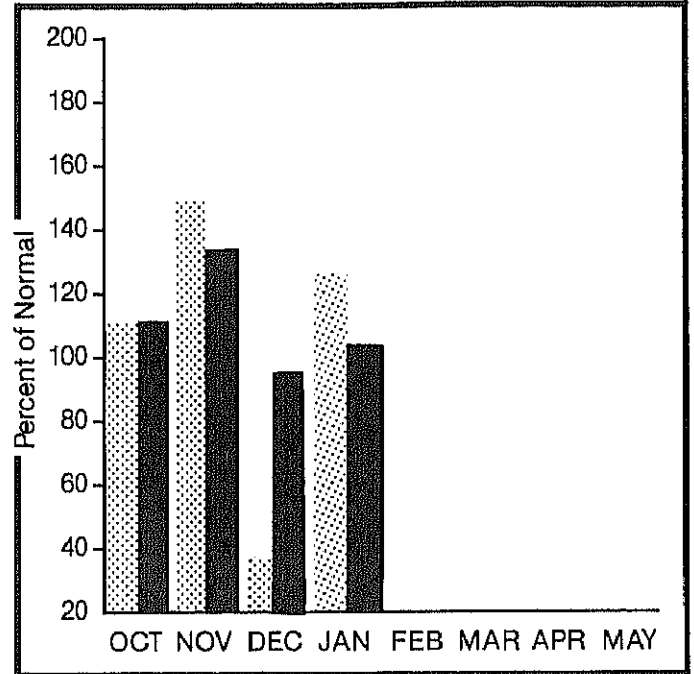
**Mountain snowpack\* (inches)**





\*Based on selected stations

Maximum  Average   
Minimum  Current 

**Precipitation\* (percent of normal)**



\*Based on selected stations

Monthly precipitation  Year to date precipitation 

## WALLA WALLA RIVER BASIN

### WATER SUPPLY OUTLOOK:

Streamflows are expected to be 88% of normal in the Walla Walla River during the spring and summer. January streamflow was at 65% of average. Snow cover is 81% if normal for the February 1 readings. Temperatures in the basins were 7 degrees above normal during January.

For more information contact your local Soil Conservation Service office.

# WALLA WALLA RIVER BASIN

## STREAMFLOW FORECASTS

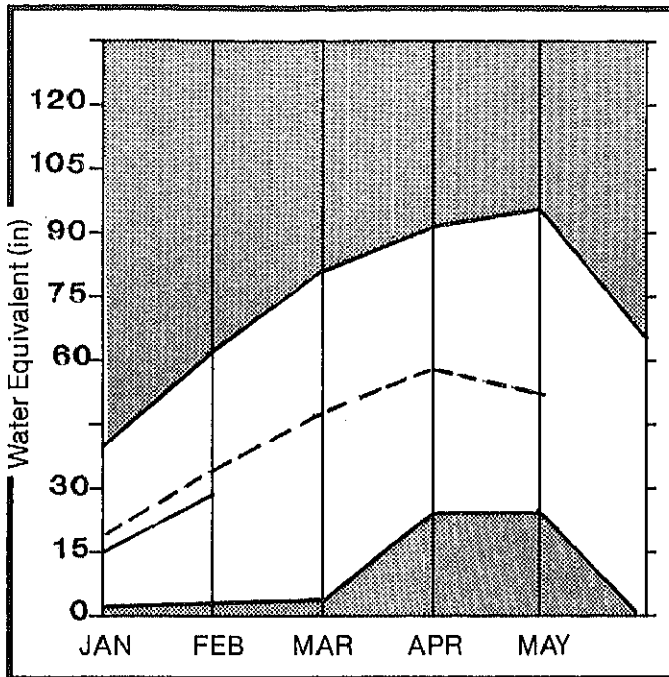
| FORECAST POINT              | FORECAST PERIOD | 20 YR. AVE. (1000AF) | MOST PROBABLE (1000AF) | MOST PROBABLE (% AVE.) | REAS. MAX. (% AVE.) | REAS. MIN. (% AVE.) | PEAK FLOW (CFS) | PEAK DATE | LOW FLOW (CFS) | LOW DATE |
|-----------------------------|-----------------|----------------------|------------------------|------------------------|---------------------|---------------------|-----------------|-----------|----------------|----------|
| MILL CREEK at Walla Walla   | APR-SEP         | 17.5                 | 15.1                   | 86                     | 120                 | 83                  |                 |           |                |          |
|                             | APR-JUL         | 17.3                 | 14.8                   | 85                     | 121                 | 82                  |                 |           |                |          |
|                             | APR-JUN         | 17.1                 | 14.7                   | 86                     | 122                 | 82                  |                 |           |                |          |
| COLUMBIA R. at The Dalles * | APR-SEP         | 101000.0             | 88400.0                | 88                     | 100                 | 80                  |                 |           |                |          |
|                             | APR-JUL         | 86500.0              | 75700.0                | 88                     | 100                 | 80                  |                 |           |                |          |
|                             | APR-JUN         | 70100.0              | 61700.0                | 88                     | 100                 | 80                  |                 |           |                |          |

| RESERVOIR STORAGE (1000AF) |                  |                           |                           | WATERSHED SNOWPACK ANALYSIS |                   |                            |              |
|----------------------------|------------------|---------------------------|---------------------------|-----------------------------|-------------------|----------------------------|--------------|
| RESERVOIR                  | USEABLE CAPACITY | USEABLE STORAGE THIS YEAR | USEABLE STORAGE LAST YEAR | WATERSHED                   | NO. COURSES AVE.D | THIS YEAR AS % OF LAST YR. | % OF AVERAGE |
|                            |                  |                           |                           | Mill Creek                  | 1                 | 44                         | 81           |

\*Corrected for upstream diversions or changes in reservoir storage.  
Average is for 1961-80 period.

# COWLITZ AND LEWIS

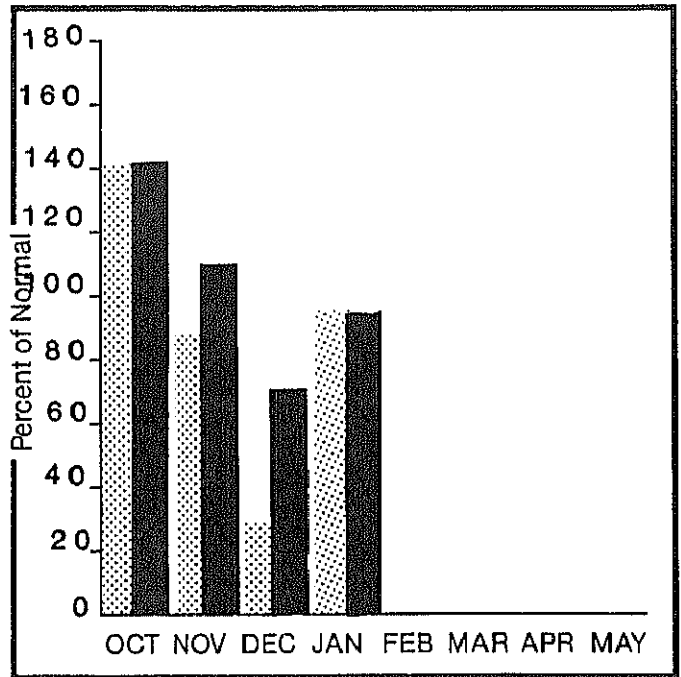
Mountain snowpack\* (inches)



\*Based on selected stations

Maximum Average   
Minimum Current

Precipitation\* (percent of normal)



\*Based on selected stations

Monthly precipitation Year to date precipitation

## COWLITZ - LEWIS RIVER BASINS

### WATER SUPPLY OUTLOOK:

Streamflow was 80% of January average on the Cowlitz River. Forecasted streamflow are 89% on the Cowlitz and 90% on the Lewis River for the April-September period. Precipitation remained below average in this basin with January having 94% of normal. Temperatures were 4 degrees above average for January. Snow cover in the Cowlitz River Basin was 82% of average and 94% on the Lewis River.

For more information contact your local Soil Conservation Service office.

# COWLITZ - LEWIS RIVER BASINS

## STREAMFLOW FORECASTS

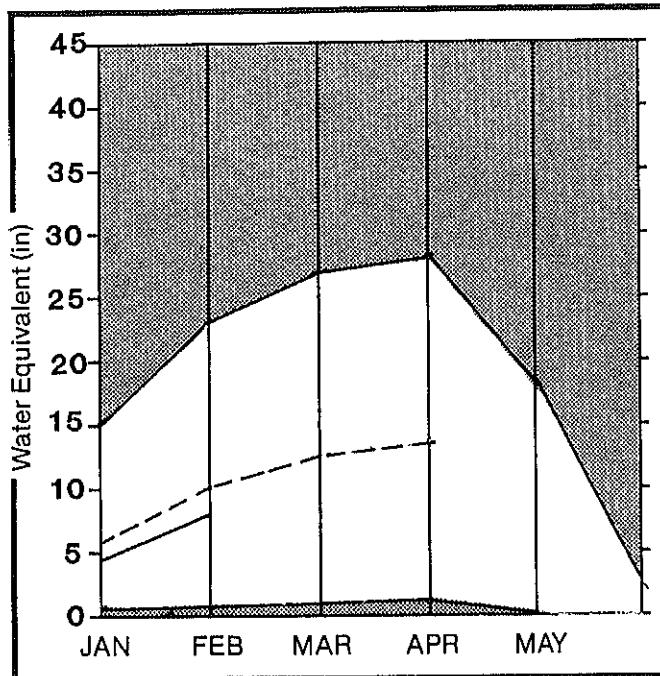
| FORECAST POINT               | FORECAST PERIOD | 20 YR. AVE. (1000AF) | MOST PROBABLE (1000AF) | MOST PROBABLE (% AVE.) | REAS. MAX. (% AVE.) | REAS. MIN. (% AVE.) | PEAK FLOW (CFS) | PEAK DATE | LOW FLOW (CFS) | LOW DATE |
|------------------------------|-----------------|----------------------|------------------------|------------------------|---------------------|---------------------|-----------------|-----------|----------------|----------|
| LEWIS RIVER at Ariel *       | APR-SEP         | 1249.0               | 1120.0                 | 89                     | 127                 | 53                  |                 |           |                |          |
|                              | APR-JUL         | 1086.0               | 980.0                  | 90                     | 127                 | 53                  |                 |           |                |          |
|                              | APR-JUN         | 961.0                | 860.0                  | 89                     | 127                 | 52                  |                 |           |                |          |
| COWLITZ R. bl Mayfield Dam * | APR-SEP         | 2038.0               | 1830.0                 | 89                     | 131                 | 49                  |                 |           |                |          |
|                              | APR-JUL         | 1778.0               | 1600.0                 | 89                     | 131                 | 49                  |                 |           |                |          |
|                              | APR-JUN         | 1502.0               | 1350.0                 | 89                     | 131                 | 49                  |                 |           |                |          |
| COWLITZ R. at Castle Rock *  | APR-SEP         | 2673.0               | 2430.0                 | 90                     | 124                 | 58                  |                 |           |                |          |
|                              | APR-JUL         | 2323.0               | 2110.0                 | 90                     | 124                 | 58                  |                 |           |                |          |
|                              | APR-JUN         | 1980.0               | 1800.0                 | 90                     | 124                 | 58                  |                 |           |                |          |

| RESERVOIR STORAGE (1000AF) |                  |                       |           |      | WATERSHED SNOWPACK ANALYSIS |                   |                   |         |
|----------------------------|------------------|-----------------------|-----------|------|-----------------------------|-------------------|-------------------|---------|
| RESERVOIR                  | USEABLE CAPACITY | ** USEABLE STORAGE ** |           |      | WATERSHED                   | NO, COURSES AVE.D | THIS YEAR AS % OF |         |
|                            |                  | THIS YEAR             | LAST YEAR | AVE. |                             |                   | LAST YR.          | AVERAGE |
|                            |                  |                       |           |      | Cowlitz River               | 1                 | 85                | 82      |
|                            |                  |                       |           |      | Lewis River                 | 4                 | 83                | 94      |

\*Corrected for upstream diversions or changes in reservoir storage.  
Average is for 1961-80 period.

# WHITE - GREEN

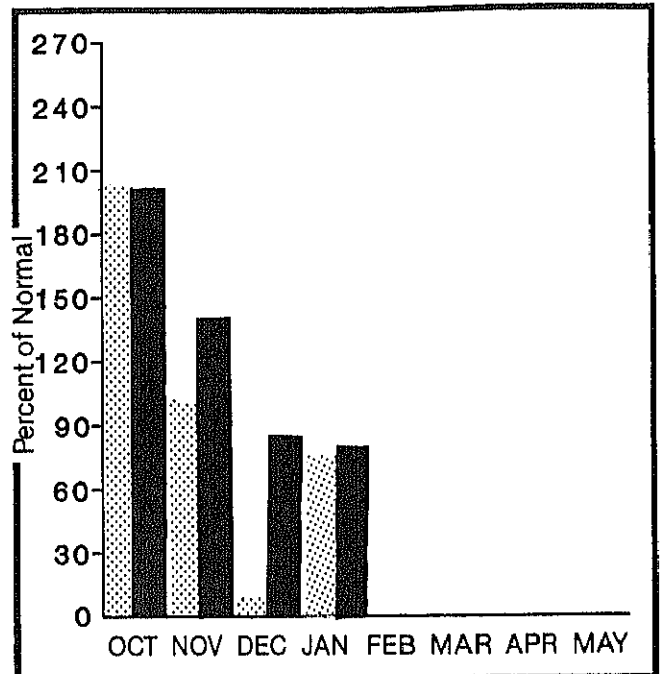
Mountain snowpack\* (inches)



\*Based on selected stations

Maximum Average Minimum Current

Precipitation\* (percent of normal)



\*Based on selected stations

Monthly precipitation Year to date precipitation

## WHITE - GREEN RIVER BASINS

### WATER SUPPLY OUTLOOK:

Snow cover on the Green River Basin was at 61% of normal for the February 1st snow survey. Streamflows are forecasted to be 76% of normal for the April-September period. Temperatures averaged 6 degrees above normal for January. Streamflows were near average for January with precipitation at 71% of normal. The water year precipitation is at 81% of average. Heavy rain on January 18 established new 24 hour precipitation records at some recording stations, and caused some local flooding.

For more information contact your local Soil Conservation Service office.

# WHITE - GREEN RIVER BASINS

## STREAMFLOW FORECASTS

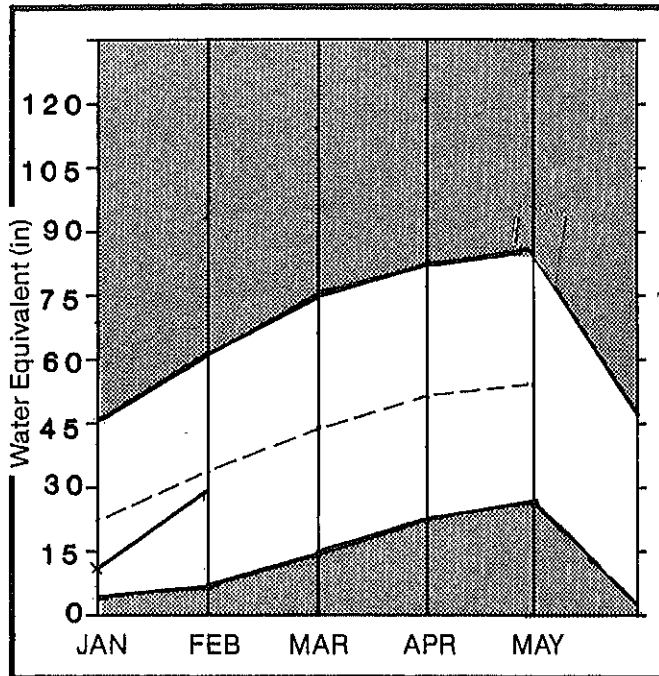
| FORECAST POINT                     | FORECAST PERIOD | 20 YR. AVE. (1000AF) | MOST PROBABLE (1000AF) | MOST PROBABLE (% AVE.) | REAS. MAX. (% AVE.) | REAS. MIN. (% AVE.) | PEAK FLOW (CFS) | PEAK DATE | LOW FLOW (CFS) | LOW DATE |
|------------------------------------|-----------------|----------------------|------------------------|------------------------|---------------------|---------------------|-----------------|-----------|----------------|----------|
| GREEN RIVER bl Howard Hanson Dam * | APR-SEP         | 316.0                | 246.0                  | 77                     |                     |                     |                 |           |                |          |
|                                    | APR-JUL         | 284.0                | 218.0                  | 76                     |                     |                     |                 |           |                |          |
|                                    | APR-JUN         | 256.0                | 190.0                  | 74                     |                     |                     |                 |           |                |          |
| CEDAR RIVER nr Cedar Falls         | APR-SEP         | 93.0                 | 84.0                   | 90                     |                     |                     |                 |           |                |          |

| RESERVOIR STORAGE (1000AF) |                  |                                    |           |      | WATERSHED SNOWPACK ANALYSIS |                   |                                       |    |
|----------------------------|------------------|------------------------------------|-----------|------|-----------------------------|-------------------|---------------------------------------|----|
| RESERVOIR                  | USEABLE CAPACITY | ** USEABLE STORAGE **<br>THIS YEAR | LAST YEAR | AVE. | WATERSHED                   | NO. COURSES AVE.D | THIS YEAR AS % OF<br>LAST YR. AVERAGE |    |
|                            |                  |                                    |           |      | White River                 | 2                 | 111                                   | 84 |
|                            |                  |                                    |           |      | Green River                 | 9                 | 50                                    | 61 |





\*Corrected for upstream diversions or changes in reservoir storage.  
Average is for 1961-80 period.

# NORTH PUGET SOUND

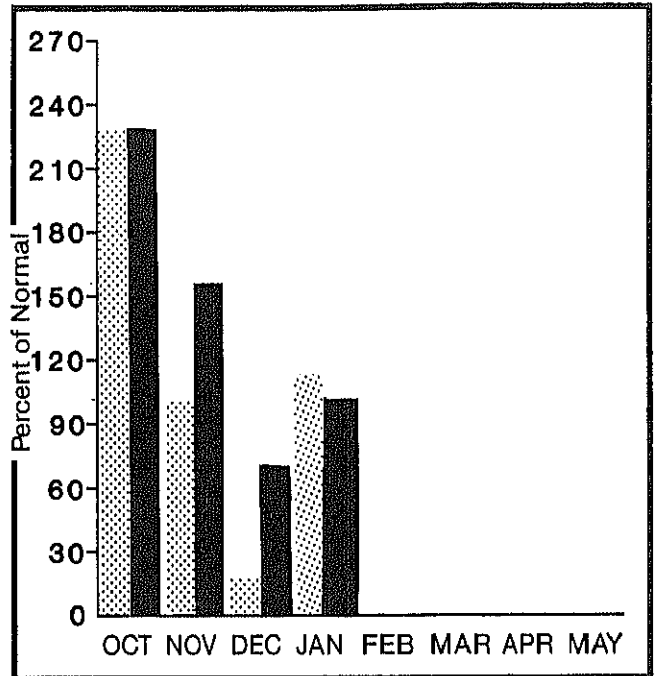
**Mountain snowpack\* (inches)**



\*Based on selected stations

Maximum  Average   
Minimum  Current 

**Precipitation\* (percent of normal)**



\*Based on selected stations

Monthly precipitation  Year to date precipitation 

## NORTH PUGET SOUND RIVER BASINS

### WATER SUPPLY OUTLOOK:

Snow cover improved in the Skagit Basin going from 78% for January 1st to 91% for February 1. Stream-flows are forecasted to be 87% of normal for the April-September period. Precipitation was 111% of normal for January bringing the water year total to 100%. Temperatures were 6 degrees above average for January. Some areas of local flooding occurred during the January 18 rain storm.

For more information contact your local Soil Conservation Service office.



# NORTH PUGET SOUND RIVER BASINS

## STREAMFLOW FORECASTS

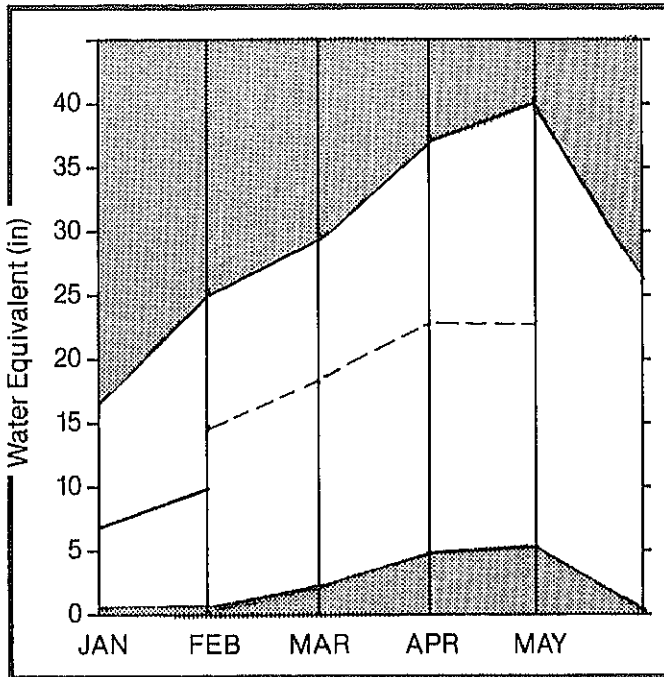
| FORECAST POINT             | FORECAST PERIOD | 20 YR. AVE. (1000AF) | MOST PROBABLE (1000AF) | MOST PROBABLE (% AVE.) | REAS. MAX. (% AVE.) | REAS. MIN. (% AVE.) | PEAK FLOW (CFS) | PEAK DATE | LOW FLOW (CFS) | LOW DATE |
|----------------------------|-----------------|----------------------|------------------------|------------------------|---------------------|---------------------|-----------------|-----------|----------------|----------|
| SKAGIT RIVER at Newhalen * | APR-SEP         | 2356.0               | 2070.0                 | 87                     | 110                 | 66                  |                 |           |                |          |
|                            | APR-JUL         | 1972.0               | 1740.0                 | 88                     | 110                 | 66                  |                 |           |                |          |
|                            | APR-JUN         | 1485.0               | 1300.0                 | 87                     | 110                 | 66                  |                 |           |                |          |

| RESERVOIR STORAGE (1000AF) |                  |                                 |           |        | WATERSHED SNOWPACK ANALYSIS |                   |                            |              |
|----------------------------|------------------|---------------------------------|-----------|--------|-----------------------------|-------------------|----------------------------|--------------|
| RESERVOIR                  | USEABLE CAPACITY | ** USEABLE STORAGE ** THIS YEAR | LAST YEAR | AVE.   | WATERSHED                   | NO. COURSES AVE.D | THIS YEAR AS % OF LAST YR. | % OF AVERAGE |
| ROSS                       | 1404.1           | 855.9                           | 880.5     | 1023.9 | Skagit River                | 13                | 105                        | 90           |
| DIABLO RESERVOIR           | 90.6             | 88.0                            | 84.2      | 86.1   | Baker River                 | 0                 | 0                          | 0            |
| GORGE RESERVOIR            | 9.8              | 7.0                             | 8.1       | 7.9    | Cedar River                 | 0                 | 0                          | 0            |
|                            |                  |                                 |           |        | Snoqualmie River            | 0                 | 0                          | 0            |
|                            |                  |                                 |           |        | Skykomish River             | 2                 | 71                         | 72           |

\*Corrected for upstream diversions or changes in reservoir storage.  
Average is for 1961-80 period.

# OLYMPIC

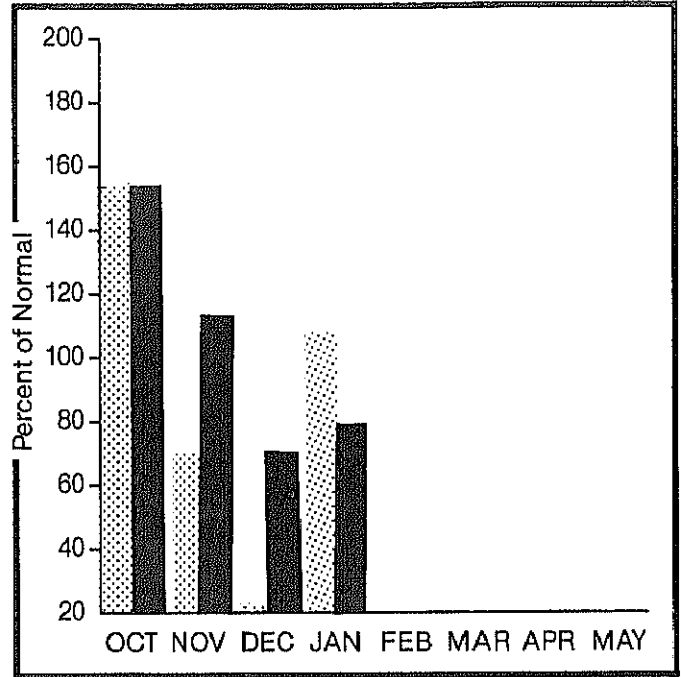
Mountain snowpack\* (inches)



\*Based on selected stations

Maximum Average   
Minimum Current

Precipitation\* (percent of normal)



\*Based on selected stations

Monthly precipitation Year to date precipitation

## OLYMPIC PENINSULA RIVER BASINS

### WATER SUPPLY OUTLOOK:

Snow cover in the Olympic Basin remained much the same as the January report, with the Dungeness 75% and the Elwah 60% of normal. Forecasted streamflows are 78% on the Dungeness and 74% on the Elwah for the April-September period. Some local flooding occurred during the rainfall of January 18. Precipitation for January was 105% of normal, bringing the water year total to 79% of average. Temperatures for January were 6 degrees above normal.

For more information contact your local Soil Conservation Service office.

# OLYMPIC PENINSULA RIVER BASINS

## STREAMFLOW FORECASTS

| FORECAST POINT              | FORECAST PERIOD | 20 YR. AVE.<br>(1000AF) | MOST PROBABLE<br>(1000AF) | MOST PROBABLE<br>(% AVE.) | REAS. MAX.<br>(% AVE.) | REAS. MIN.<br>(% AVE.) | PEAK FLOW<br>(CFS) | PEAK DATE | LOW FLOW<br>(CFS) | LOW DATE |
|-----------------------------|-----------------|-------------------------|---------------------------|---------------------------|------------------------|------------------------|--------------------|-----------|-------------------|----------|
| DUNGENESS RIVER nr Sequim   | APR-SEP         | 160.0                   | 125.0                     | 78                        |                        |                        |                    |           |                   |          |
|                             | APR-JUL         | 130.0                   | 100.0                     | 77                        |                        |                        |                    |           |                   |          |
|                             | APR-JUN         | 97.0                    | 76.0                      | 78                        |                        |                        |                    |           |                   |          |
| ELWHA RIVER nr Port Angeles | APR-SEP         | 553.0                   | 410.0                     | 74                        |                        |                        |                    |           |                   |          |
|                             | APR-JUL         | 454.0                   | 340.0                     | 75                        |                        |                        |                    |           |                   |          |

| RESERVOIR STORAGE<br>(1000AF) |                       |                                    |           |      | WATERSHED SNOWPACK ANALYSIS |                      |                                       |    |
|-------------------------------|-----------------------|------------------------------------|-----------|------|-----------------------------|----------------------|---------------------------------------|----|
| RESERVOIR                     | USEABLE 1<br>CAPACITY | ** USEABLE STORAGE **<br>THIS YEAR | LAST YEAR | AVE. | WATERSHED                   | NO. COURSES<br>AVE.D | THIS YEAR AS % OF<br>LAST YR. AVERAGE |    |
|                               |                       |                                    |           |      | Dungeness River             | 1                    | 71                                    | 75 |
|                               |                       |                                    |           |      | Horse Creek                 | 1                    | 91                                    | 80 |
|                               |                       |                                    |           |      | Elwha River                 | 1                    | 73                                    | 60 |

\*Corrected for upstream diversions or changes in reservoir storage.  
Average is for 1961-80 period.

## SNOW SURVEYS

Water is the lifeblood of the West--the crucial commodity. The region's development from a thousand years ago to today has been tied to the availability of water.

Water supply varies greatly from season to season and from year to year, and water is often located great distances from where it is needed. Snowmelt from winter accumulations in the high mountains is the source of about 70 percent of the region's water supply. Typically, irrigators and communities collect, store, and transport water to regulate quantity and ensure availability when and where it is required. With about 40 million acres under irrigation, modern agriculture together with the pressures of a rapidly expanding society make heavy demands on this water.

Since the development of new supplies has become extremely costly and not feasible in many cases, conservation of existing water resources is critical to the West.

Early westerners realized the ties between the size of the winter snowpack in the high mountain ranges--Rockies, Cascades, Sierra Nevada--and their summer water supply. Some attempts to measure the snow and predict runoff had been made in the East as early as 1834, but it wasn't until 1904 that a systematic survey was undertaken in the West. Dr. James Church, a classics professor at the University of Nevada in Reno, made surveys on Mt. Rose in the Sierra Nevada. He developed measuring equipment and sampling techniques that led to the first water supply forecasts. Success in Nevada soon spread to other states and agencies. By 1935, at last nine independent snow surveys were being conducted.

Drought is a part of life in the West. In 1934, a particularly severe drought resulted in farmers demanding better predictions of the streamflows available for growing crops. Others who counted on water for industry, power generation, and domestic use echoed this request. Congress responded in 1935 by passing legislation creating a federal snow survey and water supply forecasting program under the direction of the Bureau of Agricultural Engineering in the Department of Agriculture. In 1939, the bureau was transferred to the Soil Conservation Service (SCS); this agency continues to direct a cooperative federal, state, and private snow survey program. The National Weather Service is a major cooperator with SCS in making these water supply forecasts. Today, forecasts are routinely issued for over 600 locations in the West.

Manual surveys, similar to those initiated by Dr. Church and performed by teams of trained surveyors, have been the backbone of the measurement network. With the advent of mechanized oversnow machines and aircraft, the surveyor's task has been eased somewhat, but snowshoes and skis are still required to reach many remote sites. Periodic measurements at some 1400 snow courses provide the insight into snowpack accumulation patterns. Forecasters still use this information advantageously, but more frequent data are needed to improve the accuracy and timeliness of forecasts. Various methods of remote data acquisition have been tested, including conventional line-of-sight radio telemetry, satellite based telemetry, and a new technique called meteor burst telemetry.

Meteor burst telemetry relies on the physical phenomenon that enables radio signals to be reflected off ionized meteorite trails 50-75 miles above the earth's surface. Utilizing this principle, sites as far apart as 1200 miles can communicate with one another for very short periods ranging from fractions of seconds up to several seconds. This interval is sufficiently long to "burst" relatively short data messages between sending and receiving stations. This method of communications is ideally suited for interrogating remote data sites on a schedule of several polls per day. The interference that mountains often cause in conventional communications is not a problem for a meteor burst system.

In 1977, SCS began modernizing its snow surveys by introducing meteor burst technology for acquiring snowpack data. The project, called SNOTEL (for SNOW TELEmetry) measures and transmits snowpack, precipitation, and temperature on a daily basis throughout the West. A snow pillow serves as a hydraulic weighting platform to measure the snow water content.

About 550 SNOTEL sites are in operation. Most sites are powered by solar panels and are visited only a few times each year. Data are transmitted daily by meteor burst to a master station in Boise, Idaho, or Ogden, Utah, and then automatically forwarded by telephone to a central computer in Portland, Oregon.

Hydrologic data gathered from the SNOTEL system, snow course network, and other climatological stations are assembled in the computer system at the West National Technical Center in Portland, Oregon, for analysis and interpretation. A series of computer programs, known collectively as the Centralized Forecasting System (CFS), is the analytical tool used to generate streamflow forecasts, data summaries, and narratives that describe the current water supply outlook. This information is made immediately available to over 300 SCS field offices and other interested users through dial-up telecommunications.

Water suppliers are no longer a mystery thanks to this systematic snowpack inventory and monitoring program and advanced computer technology. Managers are alerted early in the water year to expect normal flows, water shortages, or floods, and they can make plans while there is still time to take effective action. Snow surveys and water supply forecasting do not create water, but they do the next best thing: They provide the tools for conservation of this most precious of the West's resources. For more information on this program, contact your local conservation district or SCS office.

All programs and services of the USDA  
are available to everyone without regard  
to race, creed, color, sex, age, handicap  
or national origin.

## The Following Organizations Cooperate With The Soil Conservation Service In Snow Survey Work

**Canada:** Ministry of the Environment, Water  
Investigations Branch, Victoria, British Columbia

**States:** Washington State Department of Ecology  
Washington State Department of Natural Resources

**Federal:** Department of the Army  
Corps of Engineers  
U.S. Department of Agriculture  
Forest Service  
U.S. Department of Commerce  
NOAA, National Weather Service  
U.S. Department of the Interior  
Bonneville Power Administration  
Bureau of Reclamation  
Geological Survey  
National Park Service

**Local:** City of Tacoma  
City of Seattle  
Chelan County P.U.D.  
Pacific Power and Light Company  
Puget Sound Power and Light Company  
Washington Water Power Company  
Snohomish County P.U.D.

**Private:** Okanogan Irrigation District  
Wenatchee Heights Irrigation District  
Newman Lake Homeowners Association

Other organizations and individuals furnish valuable information for snow survey reports. Their cooperation is gratefully acknowledged.